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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/196,185	11/20/1998	MYUNG-KOO HUR	6192.0052.AA	8847

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EXAMINER

QI, ZHI QIANG

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

09/196,185

Applicant(s)

HUR ET AL.

Examiner

Mike Qi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-3, 6-13 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4, 5, 14-17 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-254680 in view of US 6,219,125 (Ishikura et al) and US 6,486,494 (Jeong et al).

Claim 4, JP 8-254680 discloses (col.3, line 42 - col.4, line 17 and Fig.2) that the metal lines (wire) (gate lines and signal lines) (113) made of molybdenum (Mo), and have a second supplementary layer (115) made of the Mo-alloy located on the metal wire, and such metal layer has a good chemical resistance and protection to prevent the external influence, and it is especially suitable for protecting the metal layer from chemicals.

JP 8-254680 does not expressly disclose the supplementary layer located either on or under the entire wire layer and made of either Mo-nitride or Mo-alloy nitride, and a transparent electrode electrically connected to the wire layer such as gate lines.

However, Ishikura discloses (col.3, line 34 - col.4, line 46; Figs 1-5) that in each metal electrode (3) (it also is a wire), the adhesive layer (11) (it also is a wire) preferably comprise a metal Mo or alloy or the metal nitride (so that the adhesive layer (11) would be Mo-nitride or Mo-alloy nitride, and located under the wire (3), and the metal electrode (3) also comprises a

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material of Mo or Mo-alloy), and a layer of metal nitride would further improve the adhesiveness between the glass substrate and the metal electrodes (3); and a protective layer (13) (it also is a wire) preferably comprise a metal Mo or alloy or the metal nitride (so that the protection layer (13) would be Mo-nitride or Mo-alloy nitride, and located on the wire (3), and the metal electrode (3) also comprises a material of Mo or Mo-alloy), and a layer of metal nitride would increase a surface roughness of the metal electrodes (3), thus enhancing an electrical conduction with the transparent electrodes (5), and the transparent electrode (5) is electrically connected with the metal electrode (3).

Jeong also discloses (col.7, lines 47-62; Figs.9-10) that a wiring structure for a liquid crystal display in which the gate ITO layer (810) extended to the supplementary gate pad (640) to be connected the supplementary gate pad (640) through the contact hole (820), so that the signal would be directly applied.

Therefore, it would have been obvious to those skilled in the art at time the invention was made to arrange a wire layer made of metal or metal-alloy and a supplementary layer on or under the wire layer using metal nitride or metal-alloy nitride as claimed in claim 4 for improving the corrosion resistance, improving the adhesiveness and enhancing the electrical conduction with electrodes.

Claim 5, JP 8-254680 discloses (abstract and Fig.2) that the supplementary layer (115) comprising tungsten.

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3. Claims 14-17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art in view of JP 8-254680 and US 6,219,125 (Ishikura et al) .

Claims 14 and 21, Applicant admitted prior art (col.1, lines 11-22) indicated that in general, an LCD has:

- a substrate (insulating substrate, e.g., glass);
- a gate wire formed on the substrate;
- a gate insulating layer covering the gate wire;
- a semiconductor layer formed on the gate insulating layer;
- a data wire formed on the gate insulating layer;
- a passivation layer formed on the data wire;
- an ITO pixel electrode formed on the passivation layer and connected to the data wire (the drain electrode) through the contact hole are formed thereon.

Applicant admitted prior art does not expressly disclose the data wire is made of either metal or metal alloy, and a supplementary data wire is located either on or under the entire data wire and made of either metal nitride or metal alloy nitride.

However, JP 8-254680 discloses (col.3, line 42 - col.4, line 17 and Fig.2) that the metal lines (gate lines and signal lines) made of molybdenum (Mo) (metal), and have the second supplementary layer (115) made of the Mo-alloy and located on the metal wire, and such metal layer has a good chemical resistance and protection to prevent the external influence, and it is especially suitable for protecting the metal layer from chemicals.

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Ishikura discloses (col.3, line 55 - col.4, line 46; Figs.1-5) that in each metal electrode (3) (it also is a wire), the adhesive layer (11) (it also is a wire) preferably comprise a metal Mo or alloy or the metal nitride (so that the adhesive layer (11) would be Mo-nitride or Mo-alloy nitride, and located under the wire (3), and the metal electrode (3) also comprises a material of Mo or Mo-alloy), and a layer of metal nitride would further improve the adhesiveness between the glass substrate and the metal electrodes (3); and a protective layer (13) (it also is a wire) preferably comprise a metal Mo or Mo-alloy or the metal nitride (so that the protection layer (13) would be Mo-nitride or Mo-alloy nitride, and located on the wire (3), and the metal electrode (3) also comprises a material of Mo or Mo-alloy), and a layer of metal nitride would increase a surface roughness of the metal electrodes (3), thus enhancing an electrical conduction with the transparent electrodes (5).

Therefore, it would have been obvious to those skilled in the art at time the invention was made to arrange a wire layer made of Mo or Mo-alloy and a supplementary layer on or under the wire layer using Mo nitride or Mo-alloy nitride as claimed in claims 14 and 21 for improving the corrosion resistance, improving the adhesiveness and enhancing the electrical conduction with electrodes.

Claims 15-17, JP 8-254680 discloses (abstract; col.3, line 42 - col.4, line 17; Fig.2) that the supplementary layer (115) comprising tungsten, and the supplementary gate layer (115) is located on the gate wire (113) and made of Mo-alloy, and such metal layer has a good chemical

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resistance and protection to prevent the external influence, and it is especially suitable for protecting the metal layer from chemicals.

Therefore, it would have been obvious to those skilled in the art at time the invention was made to use a supplementary layer as claimed in claims 15-17 for achieving high corrosion resistance and especially for protecting the metal layer from chemicals.

Response to Arguments

4. Applicant's arguments filed on Aug.26, 2002 have been fully considered but they are not persuasive. .

Applicant's **only** arguments art as follows:

1) The references fail to teach or suggest the supplementary layer made of either Mo nitride or Mo-alloy nitride and located on or under a wire layer of Mo or a Mo-alloy, and a transparent electrode electrically connected to the gate electrode (wire layer).

Examiner's responses to Applicant's **only** arguments are as follows:

1) The reference Ishikura discloses (col.3, line 55 - col.4, line 46; Figs.1-5) that in each metal electrode (3) (it also is a wire), the adhesive layer (11) (it also is a wire) preferably comprise a metal Mo or alloy or the metal nitride (so that the adhesive layer (11) would be Mo-nitride or Mo-alloy nitride, and located under the wire (3), and the metal electrode (3) also comprises a material of Mo or Mo-alloy), and a layer of metal nitride would further improve the adhesiveness between the glass substrate and the metal electrodes (3); and a protective layer (13)

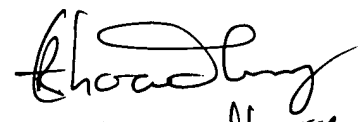
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(it also is a wire) preferably comprise a metal Mo or alloy or the metal nitride (so that the protection layer (13) would be Mo-nitride or Mo-alloy nitride, and located on the wire (3), and the metal electrode (3) also comprises a material of Mo or Mo-alloy), and a layer of metal nitride would increase a surface roughness of the metal electrodes (3), thus enhancing an electrical conduction with the transparent electrodes (5), and the transparent electrode (5) is electrically connected with the metal electrode (3). The reference Jeong also discloses (col.7, lines 47-62; Figs.9-10) that a wiring structure for a liquid crystal display in which the gate ITO layer (810) extended to the supplementary gate pad (640) to be connected the supplementary gate pad (640) through the contact hole (820), so that the signal would be directly applied.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703)308-6213 .

Mike Qi
April 3, 2003.


T. Chowdhury
Primary Examiner